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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/731,710	12/09/2003	Xian Yao	50547/CM/M277	5454

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EXAMINER	
ZHU, WEIPING	
ART UNIT	**PAPER NUMBER**
1742	

DATE MAILED: 10/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/731,710	YAO ET AL.	
	Examiner	Art Unit	
	Weiping Zhu	1742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11, 13-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-35* is/are rejected.

7)☒ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. Claims 1 and 23 have been amended and claim 35 has been added in the applicant's amendment filed on July 17, 2006. Therefore, claims 1-11 and 13-35 are currently under examination.

Status of Previous Rejections

2. The rejection of claims 1-34 under U.S.C. 103(a) as being unpatentable over Jurewicz (US Patent No. 5,159,857) in view of Bunting et al. (US Patent No. 4,762,445) is withdrawn in view of the applicant's amendment filed on July 17, 2006. A new rejection ground follows.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claim 1-3, 6, 10, 11, 13, 14, 16, 20, 27-29 and 31-34 are rejected under 35 U.S.C. 103(a) as unpatentable over Bovenkerk et al (US Patent No. 4,311,490) in view of Bovenkerk et al. (US Patent No. 4,224,380).

With respect to claim 1, Bovenkerk et al. ('490) discloses a process for preparing a ultra hard compact comprising (claim 1):

placing within a protective shield metal enclosure which has a inner wall as the applicants claimed

1. a mass of abrasive crystals;

2. a mass of catalyst metal (the examiner asserts that the catalyst metal herein provides similar functions as the metallic liner in applicant's claims)

subjecting the contents of the shield metal enclosure to a high pressure/ high temperature apparatus.

However, Bovenkerk et al. ('490) is silent on infiltration to the said diamond or CBN compact by the said interface binder and removing of the infiltrated portion.

Bovenkerk et al. ('380) discloses a method of bonding a mass of diamond particles, aided by a sintering aid material, under high temperature and pressure (HT/HP) to form an abrasive body comprised of said particles in a self-bonded form (abstract).

Bovenkerk et al. ('380) further discloses the said sintering aid material infiltrates throughout the said body. The said body is then treated to remove substantially all infiltrated material (abstract).

It would have been obvious to one having ordinary skill in the art at the time of this invention to remove the peripheral portion infiltrated by the catalyst metal as disclosed by Bovenkerk et al. ('380) in the process of Bovenkerk et al. ('490) to ensure the thermal stability of the said compact as disclosed by Bovenkerk et al. ('380).

With respect to claims 2, 3 and 32, Bovenkerk et al. ('490) discloses the said protective shield metal enclosure is formed of zirconium (Col. 5, line 55) and the said catalyst metal is cobalt (claim 3).

With respect to claim 6, Bovenkerk et al. ('490) discloses that for a composite compact, a mass of metal carbide is also placed within said enclosure (claim 2).

With respect to claim 10 and 11, Bovenkerk et al. ('490) discloses that said abrasive crystals are selected from the group consisting diamond and cubic boron nitride (CBN) (claim 1, A. (1)).

With respect to claim 13, Bovenkerk et al. ('490) in view of Bovenkerk et al. ('380) are silent on the depth of the infiltration of said sintering aid material into said mass of diamond particles.

However, it would have been obvious to one having ordinary skill in the art at the time of this invention the difference in infiltration directions (axial or radial) may result in the differences in infiltration depth under the same HT/HP sintering configuration. Therefore, it would have been within the expected skill to adjust the depth of infiltration in the process of Bovenkerk et al. ('490) in view of Bovenkerk et al. ('380), based on the radial infiltration in order to balance the bonding strength and thermal stability of said compact.

With respect to claim 14, Bovenkerk et al. ('490) discloses the resulting compact is an improved composite compact of the type comprising a sintered carbide mass which supports or surrounds a mass or layer of polycrystalline abrasive crystal grains and a bonding metal (Col. 3, lines 7-14). The said compact possesses a better bond of the mass of abrasive crystals to the substrate and a polycrystalline mass which possesses improved integrity (Col. 3, lines 36-39).

With respect to claim 16, Bovenkerk et al. ('490) discloses that the direct bonding of abrasive crystals to adjacent crystals in a self-bonded relationship achieved in their invention is essential for achieving compacts highly suitable for use in cutting tools and dies (Col. 4 lines 58-63).

With respect to claim 20, Bovenkerk et al. ('490) discloses placing a mass of catalyst metal in a protective shield metal enclosure (claim 1). The melting temperature of said protective shield metal enclosure (Zirconium) is higher than that of said catalyst metal (Cobalt).

With respect to claim 27, 31 and 33, Bovenkerk et al. ('490) discloses the said catalyst metal is elemental cobalt (claim 3).

With respect to claim 28 and 34, Bovenkerk et al. ('490) discloses a mass of catalyst without the metal carbide support can be used to make an improved compact of diamond or CBN as described herein (Col. 4, lines 15-18).

With respect to claim 29, Bovenkerk et al. ('490) discloses said metal carbide is selected from the group consisting of tungsten carbide, titanium carbide, tantalum carbide and mixtures thereof which contains said catalyst metal (claim 2).

5. Claim 4, 5 and 17-19 are rejected under 35 U.S.C. 103(a) as unpatentable over Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) as applied to claim 1 and further in view of Griffin et al. (US Patent No. 6,439,327 B1).

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) is applied as disclosed above in claim 1.

However, Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) do not teach the claimed features of claims 4, 5, 17-19 of the instant invention.

With respect to claim 4, Griffin et al. ('327 B1) discloses in Fig. 7 sandwiching a ring-shaped metallic layer (73) between the outer enclosure or can (74) and diamond material (71). It would have been obvious to one having ordinary skill in the art at the time of this invention to sandwich the catalyst metal between the mass of the abrasive crystals and the protective shield metal enclosure as disclosed by Griffin et al. ('327 B1) in the process of Bovenkerk et al. ('490) to enhance the bonding strength and thermal stability of said compact as disclosed by Bovenkerk et al. ('380) (Col. 4, lines 3-9).

With respect to claim 5, Griffin et al. ('327 B1) discloses in Fig. 7, said out enclosure has a inner wall comprising a peripheral wall and said ring-shaped metallic layer is disposed adjacent the peripheral wall. It would have been obvious to one having ordinary skill in the art at the time of this invention to use this annular configuration disclosed by Griffin et al. ('327 B1) in the process of Bovenkerk et al. ('490) to study the effect of infiltration direction on the bonding strength and thermal stability of said compact as disclosed by Bovenkerk et al. ('380) (Col. 4, lines 3-9).

With respect to claim 17, Griffin et al. ('327 B1) is silent on how said ring-shape metallic layer is formed. However, it would be obvious to one having ordinary skill in the art at the time of Griffin et al. ('327 B1)'s invention to use a strip of said ring-shape metallic layer material and join the two ends of the strip by a feasible method to form a cylindrical shape.

With respect to claim 18, Griffin et al. ('327 B1) discloses metallic layer is in a ring-shape. It would have been obvious to one having ordinary skill in the art at the time of this invention was made to use a ring-shape metallic layer in the radial direction disclosed by Griffin et al. ('327 B1) in the process of Bovenkerk et al. ('490) to control catalyst metal's infiltration for desirable bonding strength and thermal stability of said compact as disclosed by Bovenkerk et al. ('380) (Col. 4, lines 3-9).

With respect to claim 19, Griffin et al. ('327 B1) discloses that said metallic material layer forms a continuous rim around the edge of the facing table (claim 8). It would have been obvious to one having ordinary skill in the art at the time of this invention for the catalyst metal in the process of Bovenkerk et al. ('490) to form a continuous coverage around the edge of said compact as disclosed by Griffin et al. ('327 B1) to enhance the bonding strength and thermal stability of said compact as disclosed by Bovenkerk et al. ('380) (Col. 4, lines 3-9).

6. Claim 7-9, 15, 21, 22, 24-26 and 30 are rejected under 35 U.S.C. 103(a) as unpatentable over Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) as applied to claim 1 and further in view of Gigl (US Patent No. 4,525,179).

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) is applied as disclosed above in claim 1.

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) does do not teach the claimed features in claims 7-9, 15, 21, 22, 24-26 and 30.

Gigl ('179) discloses that at HT/HP conditions in the presence of diamond, nickel melts or forms a eutectic at about 1394° C, while the corresponding cobalt diamond eutectic occurs at about 1317° C (Col. 5, lines 61-66).

Gigl ('179) is silent on eutectics and their melting temperatures between refractory metals and Fe, Co, and Ni; between B and Fe, Co, and Ni and, among refractory metals, diamond or B, and Fe, Co, and Ni, but refers to Strong, H. M. and Tuft, R. E., "The Cobalt-Carbon System at 56 Kilobars," General Electric Company Technical Information Series, July, 1974; and Strong, H. M. and Hanneman, R. E., "Crystallization of Diamond and Graphite," The Journal of Chemical Physics, Vol. 46, pp. 3668-3676, (May, 1967) (Col. 5 line 66 – Col. 6 line 3).

The examiner asserts the eutectics and their melting temperatures cited above have already been published before the instant invention of the applicants and are accessible to the public. It would be obvious to one having ordinary skill in the art at the time this invention was made to select a said protective shield metal enclosure material, said catalyst metal and said metal carbide combination that will have a reduced difference in the melting temperatures of the eutectics formed during the HT/HP sintering process with the presence of diamond or B in order to reduce the crack propagation in said composite compact as disclosed by Gigl ('179) (Col 3, lines 32-36).

7. Claim 23 is rejected under 35 U.S.C. 103(a) as unpatentable over Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) as applied to claim 1 and further in view of Cerutti et al. (US Patent No. 5,603,070).

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) is applied as described above in claim 1.

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) do not teach the claimed feature of claim 23.

With respect to claim 23, Cerutti et al. ('070) discloses a method to make a metal carbide supported polycrystalline diamond (PCD) compact having improved shear strength and impact resistance properties (abstract); An interlayer mass is disposed adjacent to the PCD particles (claim 1 (a) (II); PCD compact having shear strength and impact resistance properties improved over conventional supported PCD compacts wherein the PCD layer is bonded directly to the cemented carbide support layer (Col. 4 lines 51-54); Additional advantages of the present invention include reduced risk of stress cracking, delamination, or the like (Col. 5, lines 38-45); that upon heating and cooling, the stresses generated are relieved principally through the deformation of the abrasive table (Col. 4, lines 4-6).

Cerutti et al. ('070) is silent on that said interlayer forms a plastically deformable region during a cooling phase of the HT/HP sintering.

However, it would be obvious to one having ordinary skill in the art at the time of this invention that during the HT/HP sintering cooling process, the said catalyst metal is in a molten state as disclosed by Bovenkerk et al. ('380) (Col. 3, lines 27-32), it would form a plastically deformable region on cooling.

8. Claim 35 is rejected under 35 U.S.C. 103(a) as unpatentable over Bovenkerk et al. ('490) in view of Bovenkerk et al. ('380) as applied to claim 1 and further in view of Csillag (US Patent No. 4,797,326).

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) is applied as disclosed above in claim 1.

Bovenkerk et al ('490) in view of Bovenkerk et al. ('380) do not teach the claimed feature in claim 35

Csillag ('326) discloses a process for fabricating a supported composite polycrystalline diamond or CBN compact with a plastically deformable support (claim 1). An interface binder is disposed between said compact and said support (claim 8).

Csillag ('326) further discloses that the thickness of the interface binder tested ranges from 1.8 to 4.8 mils, which is within the claimed range of 0.005mm to 3mm.

It would have been obvious to one having ordinary skill in the art at the time of this invention to control the thickness of the catalyst metal layer in the process of Bovenkerk et al. ('490) to enhance the bonding strength and thermal stability of said compact as disclosed by Bovenkerk et al. ('380) (Col. 4, lines 3-9).

Response to Arguments

9. Applicants arguments filed on July 17, 2006 have been fully considered, but they are moot in view of the new ground of rejection.

Conclusions

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose telephone number is 571-272-6725. The examiner can normally be reached on 8:30-16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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